

**In the Drawings**

There are no amendments to the drawings.

### **Remarks**

The Examiner has rejected Claims 1 – 6, 13 and 25 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,274,871 to Dukor (“the ’871 patent”) in view of U.S. Patent No. 6,396,048 to Schanz (“the ’048 patent”). The Examiner has further rejected Claims 26 – 43 under 35 U.S.C. §103(a) as being unpatentable over the ’871 patent in view of the ’048 patent and further in view of U.S. Patent No. 5,512,749 to Iddan (“the ’749 patent”). ). The Examiner has still further rejected Claims 8 – 12 under 35 U.S.C. §103(a) as being unpatentable over the ’871 patent in view of the ’048 patent and further in view of U.S. Patent No. 5,712,685 to Dumas (“the ’685 patent”). The Examiner has yet further rejected Claim 7 under 35 U.S.C. §103(a) as being unpatentable over the ’871 patent in view of the ’048 patent and further in view of U.S. Patent No. 5,091,646 to Taylor (“the ’646 patent”). The Examiner has still further rejected Claim 44 under 35 U.S.C. §103(a) as being unpatentable over the ’871 patent in view of the ’048 patent and further in view of U.S. Patent No. 5,123,953 to Harris (“the ’953 patent”). These rejections are respectfully traversed.

### **35 U.S.C. §103(a) Rejections**

Presently claims 1, 25, 40 and 44 each require among other elements “an IR microscope” where “the outputs of the detector elements being directly fed in parallel to processing circuitry for image processing of the detector element outputs, each detector element having its own associated detection circuitry.”

The Examiner has submitted that while the '871 patent does not teach that outputs of the detector elements are directly fed in parallel to processing circuitry for image processing of the detector element outputs, each detector element having its own associated detection circuitry, the '048 patent "discloses individual detector elements being fed in parallel as each element is read out individually to processing means for processing the detector element outputs." (Official Action, p. 2). The Examiner further states that it would have been obvious to one of ordinary skill in the art to combine these references to "increase the speed at which the data is processed." (Official Action, p. 3).

However, Applicant submits that it is well settled that the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990). It is also well settled that if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). In the present case, Applicant respectfully submits that there is no suggestion in either reference to make the combination the Examiner has suggested.

First, Applicant respectfully submits that one skilled in the art of the present invention, looking at the '871 patent (Dukor) would not look to the '048 patent (Schanz), as this reference is in a very different field. The present invention relates to, and every claim currently pending requires, an IR microscope. The '048 patent is not directed to

IR technology or an IR microscope. Rather, the '048 patent appears to be directed toward and teaches increasing the signal-to-noise ratio of optical signals picked up by photodiodes, parasitic bipolar transistors, photogates and photosensitive MOSFETs for such applications as "improving the quality of a television picture." (Col. 1, lines 19 – 21; Col. 2, lines 4 – 21). These elements, while applicable for a broad range of applications, cannot be effectively used with an IR microscope. Therefore, Applicant respectfully submits that there is no motivation to combine these two references that are directed to different arts.

Second, Applicant respectfully submits that the assertion that it would have been obvious for one skilled in the art to import the features of the '048 patent (Schanz) into the design of the '871 patent (Dukor) is unsupportable. At the time immediately preceding the present invention, the field of FT-IR microspectroscopic imaging was moving away from single-detector operation and towards the use of extremely large, two-dimensional focal plane arrays typified by the design disclosed in the '871 (Dukor) reference. Such an array—which has 4096 elements—was prompted by the ready availability of such arrays and the prevailing and seemingly obvious theory that more detectors being operated simultaneously would mean faster imaging.

However, these large numbers of detectors required the adoption of special techniques for extracting the signals through a practical number of connections, and the detector arrays came with very localized signal handling in the form of multiplexing. Unknown to those skilled in the art, this multiplexing results in very inefficient capture of

the photon signal and, due to the necessity of a good signal to noise ratio in the spectra, such an array of 4096 multiplex detectors can actually be outperformed by the 16 directly connected detectors as used in the present invention which is the subject of the present application. Applicant respectfully submits that this apparently retrograde step towards a small array using the design of the present invention is contrary to trend in this field, and therefore, would not be in any way obvious to those skilled in the art, and there is clearly no suggestion in the '871 patent (Dukor) that would suggest the desirability of such a modification.

Regardless, even if one were to select the detection elements from the '871 patent to be combined with the detection circuitry of the '048 patent it is doubtful that these would be compatible. While the detection circuitry of the '048 patent is directed toward use with photodiodes, transistors, photogates, the '871 patent teaches that mercury-cadmium-telluride (MCT) infrared detector chips are used for the detection elements. ('871 patent, Col. 1, lines 19 – 21; '048 patent, Col. 4, lines 43 – 45). Nowhere, however, does it state in either reference that the output of the detection elements in the '871 patent would be compatible with the detection circuitry of the '048 patent, which is directed toward a different technology.

Additionally, even if one were to combine the '871 patent with the '048 patent, the resulting device would be very large in size, extremely costly and probably would not even function. For example, the '871 patent teaches that "the focal-plane array detector 62 uses a mercury-cadmium-telluride (MCT) infrared detector chip with 64x64 pixels."

(Col. 4, lines 43 – 45). This is exactly the problem the present application identified as a major drawback of present systems. For example, it was stated that “[i]n order to reduce measurement times microscopes have been designed which incorporate large detector arrays rather than single detector elements. One such arrangement uses an integrated array of 64x64 liquid nitrogen cooled photovoltaic MCT detectors each having an area of 60 microns square . . . such arrangements however are extremely expensive and typically cost more than 3 times that of a microscope with employs a single detector.” (pp. 2 – 3). In addition, the system probably would not work, as stated in the application, which notes that a relatively “small detector array will typically comprise between 3 and 100 detector elements. Typically the upper limit will be 64 and a preferred arrangement will have 16.” (p. 4). Alternatively, the 64x64 array taught in the '871 patent would comprise upward of 4100 detector elements. Providing upwards of 4100 parallel fed circuit and an equal number of associated detection circuitry would not be feasible in terms of cost or size and space, and it is even doubtful whether such an unwieldy system would even function. Applicant respectfully submits that the combination of the '871 patent with the '048 patent therefore cannot be obvious.

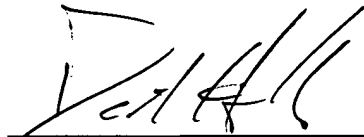
In addition, one would have to discard the teaching of the '871 patent with respect to the detector array if one were to attempt to combine it with the '048 patent, as it is doubtful this enormous detection array would function, and the '048 patent detection element would also not function to detect infrared radiation. Therefore, even with the combination of these references one cannot arrive at the present invention.

Accordingly, Applicant respectfully submits that due to the vast differences in the technologies of the '871 patent and the '048 patent it is unclear if these references could in fact be combined and still accomplish the intended purpose the '871 patent. Even if such a combination could in fact be accomplished, one would not arrive at the present invention. Rather, Applicant further respectfully submits that the result would be an extremely costly and unwieldy device.

Therefore, because neither the '871 patent nor the '048 patent teach, disclose or suggest an IR microscope where outputs of the detector elements are directly fed in parallel to processing circuitry for image processing of the detector element outputs, each detector element having its own associated detection circuitry as required by Claims 1, 25, 40 and 44, no combination of these references can render these claims obvious.

For all of the above reasons, it is respectfully submitted that claims 1, 3 – 13 and 25 - 44, all of the claims remaining in the application, are in order for allowance and early notice to that effect is respectfully requested.

Respectfully submitted,



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